hoped that this preliminary amendment shall satisfy the concerns raised by the Examiner with respect to the parent application.

In an Office Action dated October 29, 1991, claims 1-66 of the parent application were finally rejected under 35 U.S.C. § 103 as being unpatentable over Clandinin et al. in view of Traitler et al. Applicant respectfully traverses this rejection to the extent it may be applied to the present application for the following reasons.

The rejection is premised upon the mistaken assumption that "the claims appear to be drawn to processes and compositions for diet supplements containing long chain polyunsaturated fatty acids." As explained by the inventor during the interview, the present claims are drawn to processes and compositions for diet supplements which contain microbial oils which, in turn, comprise a long chain polyunsaturated fatty acid ("PUFA") in the form of a triglyceride.

As is made more clear by the present amendments, the claims explicitly require the use of microbial oil. In particular, certain of the dependent claims are directed towards particular microbial oils known as ARASCO and DHASCO. These oils comprise ARA and DHA in triglyceride form. The primary reference cited against the parent application, Clandinin et al., teaches the use of egg yolk lipid and fish oil to provide an edible fat oil product for incorporation in an infant formula. Nowhere do Clandinin et al. recognize, teach or suggest that microbial oils such as ARASCO and DHASCO can be used as dietary supplements.

Nowhere do Clandinin et al. teach or suggest that microbial oils contain long chain polyunsaturated fatty acids. The present invention is not concerned with the use of fatty acids from either egg yolk or fish oil. First, as taught by Clandinin et al., the lipid obtained from egg yolk is in a phospholipid form. Such a form is chemically distinct from the fatty acids found as a triglyceride oil as utilized in the present invention.

As is known to those of skill in the art, phospholipids are polar molecules, i.e., hydrophillic. Triglycerides, as required by the present invention, are non-polar hydrophobic molecules. Thus, phospholipids typically are located in cell membranes and are acted upon by phospholipases, whereas triglycerides are located in fat globules in, for example, human breast milk and are acted upon by lingual and pancreatic lipases. An advantage of the present invention is that it provides long chain PUFAs in the form found naturally, i.e., in human breast milk. Providing egg yolks or red blood cell phospholipids as the PUFA source does not provide this advantage.

Clandinin's other PUFA source is fish oil. Although fish oil does provide PUFAs in the form of triglycerides, there is a significant difference between microbial oil PUFAs and fish oil PUFAs. In fish oil, DHA has a strong positional preference for the middle carbon (Sn_2) of the triglyceride. In microbial oils, the DHA has a strong positional preference for the Sn_1 and Sn_3 carbons. As illustrated in Ackman (copy enclosed), the positional specificity of the PUFA governs the metabolic pathway.

[See Figure 3 of Ackman.] Thus, Sn_1 and Sn_3 fatty acids, cleaved from the triglyceride by pancreatic lipases, go directly into the bloodstream and from there to the brain, via the liver, where they can be used in brain development. That is the route of metabolism provided by this invention and by human breast milk, but not by Clandinin's teaching to use fish oil, egg yolk, or red blood cell phospholipids.

Additionally, the present invention cures a longstanding problem encountered with the use of lipids obtained from fish oil, that is the rank odor associated with fish oils. No such odor is encountered when using the present invention.

In contrast to the citation in the Office Action that Clandinin teaches the obtention of arachidonic acid, docosahexanoic acid and eicosapentaneoic acid from vegetable oils, reference to Table III of Clandinin et al. shows that the long chain fatty acids, i.e., longer than 18 carbons, are provided from egg yolk lipid, fish oils, or red blood cell phospholipids. It is only the shorter fatty acids which are obtained from vegetable oils, as is well known to those of skill in the art. As discussed above, there <u>is</u> a chemical distinction between the oils of the present invention and those taught by Clandinin et al.

It is the claimed invention as a whole which must be considered upon making a determination of obviousness. <u>Panduit Corp. v. Dennison</u>, Mfg. Co., 1 U.S.P.Q. 2d 1593, 1597 (Fed. Cir. 1987) <u>cert</u>. <u>denied</u> 107 S. Ct. 2187. In the rejection of claims

1-66 of the parent application, an essential element of the claimed invention, the microbial oil, had been read out of the claim. As has been explained, the microbial oil of this invention is not a phospholipid, but rather is a triglyceride containing PUFAs at the 1 and 3 positions. This has been made even more explicit by the present amendment and must not be disregarded.

The present invention also has certain advantages not possessed by the prior art. First, as known to those of skill in the art, long chain PUFAs are not obtainable from vegetable sources. Prior sources of such PUFAs included, as taught by Clandinin et al., fish oils, egg yolks, and red blood cells. Not only do such sources produce long chain PUFAs in the form of phospholipids or 2-positioned monoglycerides, but only limited production can occur. In contrast, in the present invention, as taught in the specification, microorganisms can be cultivated to produce large quantities of single-cell oils containing long chain PUFAs in the form of triglycerides. Thus, the present invention offers a significant benefit not taught by the prior art, i.e., ease of production. A further advantage that the present invention has over the prior art is the elimination of unpleasant odors typically associated with fish oil, egg yolk and blood. Such odors have been known to render the fatty acid produced from such sources unpalatable such that it could not be used as a food supplement without undergoing extensive processing. This is disclosed in Long WO89/00606, attached

herewith and cited on the accompanying PTO Form 1449. Additionally, fish oil is so highly unsaturated that although it can be processed to be odorless, it does not stay odorless for long. Fish oil is very prone to oxidation and the oxidation products are toxic peroxides. The products of the present invention do not suffer from this problem.

Thus, the present invention solves problems, the existence of which are not even suggested by Clandinin et al. These are ease of production of essential long chain PUFAs in triglyceride form, elimination of unwanted odors and minimization of toxic peroxide products. The problems solved by an invention are always relevant to a consideration of obviousness. In re Wright, 6 U.S.P.Q. 2d, 1959, 1961-62 (Fed. Cir. 1988).

The constant criterion for determination of obviousness is whether the prior art, here Clandinin et al. in view of Traitler et al., would have suggested to one of ordinary skill in the art that the invention should be carried out and would have a reasonable likelihood of success. In Re Sernaker, 217 U.S.P.Q. 1 (Fed. Cir. 1983). Both the suggestion and the expectation of success must be founded in the prior art and not in the Applicant's disclosure. In Re Dow Chemical Co., 5 U.S.P.Q. 2d 1529, 1531 (Fed. Cir. 1988). Since Clandinin et al. do not even hint that microbial oils can be utilized as a source of long chain polyunsaturated fatty acids, Applicant respectfully submits that the teachings of the present specification have been read

into the prior art. Such a hindsight reconstruction of the present invention is impermissible.

The Office Action concludes with the assertion that "Applicants have shown nothing unexpected by using microbial oils." Applicants note that the law does not require a showing of an unexpected result. Indeed, an "unexpected result" is not a requirement for patentability. Tanduit Corp. v. Dennison Manufacturing Co., 227 U.S.P.Q. 337, 348 (Fed. Cir. 1985) vacated and remanded, 475 U.S. 809 (1986) on remand, 1 U.S.P.Q. 2d 1593 (Fed. Cir. 1987) cert. denied, 107 S. Ct. 2187 (1987). Notwithstanding that there is no requirement that unexpected results be shown, Applicants have shown such results. The very fact that microorganisms can be used to produce the oils of the present invention is unexpected. Moreover, the positional specificity of the fatty acids in the present invention provides the unexpected advantage over the fish oils of Clandinin et al. of being more easily and readily absorbed, as discussed above.

For all of the foregoing reasons, Clandinin et al. is a deficient reference. The secondary reference, Traitler et al. suffers from the same inadequacies and therefore does not cure the above-described deficiencies of Clandinin et al. Traitler et al. disclose only the obtention of an oil containing γ-linoleic acid from a fruit. Traitler et al. do not suggest that microbes can produce useful oils. Accordingly, there can be no teaching by Traitler et al. to use microbial oil as specified in the present claims.

It must be reemphasized by Applicant that the fatty acids contained within the microbial oils of the present invention take the form of triglycerides. These are not chemically the same as the fatty acids disclosed in the cited references. Even if they were, however, it is Applicant's discovery that various microbes can be cultivated to produce single-cell oils which can be used as described and claimed in the present application. Neither the primary nor the secondary reference even hints at the existence of microbial oils. Accordingly, it is respectfully submitted that it is only by reference to the teachings of the present specification that the rejection has been issued. Such is an impermissible hindsight reconstruction of the present invention.

Applicant wishes to take this opportunity to make several references of record. The references are listed on the accompanying PTO form 1449 and copies are enclosed. Applicant does not admit that any of these references are prior art and reserves the right to antedate any reference. The last five references are cited as evidentiary support for the remarks made by Applicant in this preliminary amendment.

CONCLUSION

In conclusion, in view of the foregoing preliminary amendment and remarks, Applicant respectfully submits that the present application is in condition for allowance.

Respectfully submitted,

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